

# ES&H manual

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## Environment, Safety, and Health

### Volume III

#### Part 34: Remediation and Monitoring

## Document 34.1 Site Cleanup Requirements

Recommended for approval by the ES&H Working Group

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New document or new requirements

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## 34.1

### Site Cleanup Requirements\*

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\* Editorial revision

## 34.1

### Site Cleanup Requirements

## 1.0 Introduction

The Lawrence Livermore National Laboratory (LLNL) is required to comply with federal, state, and local regulations governing the investigation and cleanup of potentially contaminated soil and ground water. The most significant site cleanup activities at LLNL are organized efforts directed toward the remediation of contamination associated with historic activities at the LLNL Livermore site and Site 300. Examples include ongoing pump-and-treat projects and those involving firing table gravel.

The cleanup of soil and ground water contamination caused by prior activities is regulated by federal and state Superfund laws, specifically 42 USC § 9601 et seq., Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund). CERCLA specifies site identification, investigation, and cleanup procedures. The National Priority List (NPL) or Superfund List is a prioritized list of the nation's most contaminated sites. The U.S. Environmental Protection Agency (EPA) oversees remediation of sites under CERCLA; the California EPA (Cal/EPA), Department of Toxic Substances Control (DTSC), oversees remediation of sites under the state program. The Regional Water Quality Control Boards (RWQCBs) also have broad authority to issue cleanup and abatement orders to remedy contamination that may adversely affect the quality of ground water and surface waters (rivers, lakes, streams, and wetlands). Thus, contaminated land or water not subject to the federal or state Superfund program may still be subject to a cleanup process administered by the RWQCBs.

The EPA, the Department of Energy (DOE), the DTSC, and the appropriate RWQCB entered into Federal Facility Agreements (FFAs) under CERCLA for the LLNL Livermore site and Site 300. These agreements integrate under a single procedural framework DOE's CERCLA response obligations with Resource Conservation and Recovery Act of 1976 (RCRA) corrective action obligations (under Public Law 94-580) that relate to releases of hazardous substances, hazardous wastes, pollutants, or contaminants.

The DOE is the lead agency for LLNL's cleanup actions. At LLNL, the Environmental Restoration Division (ERD) of the Environmental Protection Department (EPD) is responsible for carrying out LLNL's CERCLA program. This document summarizes the regulations, requirements, and your responsibilities related to soil and ground water cleanup.

Beyond the Laboratory's major and organized site cleanup projects related to soil and ground water, a second type of cleanup activity is germane to this document. It is possible to encounter contaminated soil or debris during excavation, demolition, or construction activities. In addition to cleanup regulations imposed by federal, state, and local agencies, LLNL policy dictates that soil and debris (e.g., asphalt and concrete) are to be characterized and evaluated for potential hazardous and radioactive contamination prior to reuse onsite or disposal offsite. On discovering any incidental contamination, you are required to immediately coordinate with ERD. Your Environmental Safety and Health (ES&H) Team, including the environmental analyst, will assist in the process by evaluating potentially contaminated soil and debris, addressing potential health hazards, negotiating cleanup plans, and notifying the regulatory agencies and the DOE, if necessary. Section 3.0 of this document reviews your principal responsibilities, and Section 4.0 summarizes the general process for compliance upon discovery of contaminated soil and debris related to excavation, demolition, or construction. Please refer to Document 33.3, "Management of Soil and Debris," in the *ES&H Manual* for more detailed information about requirements and your responsibilities.

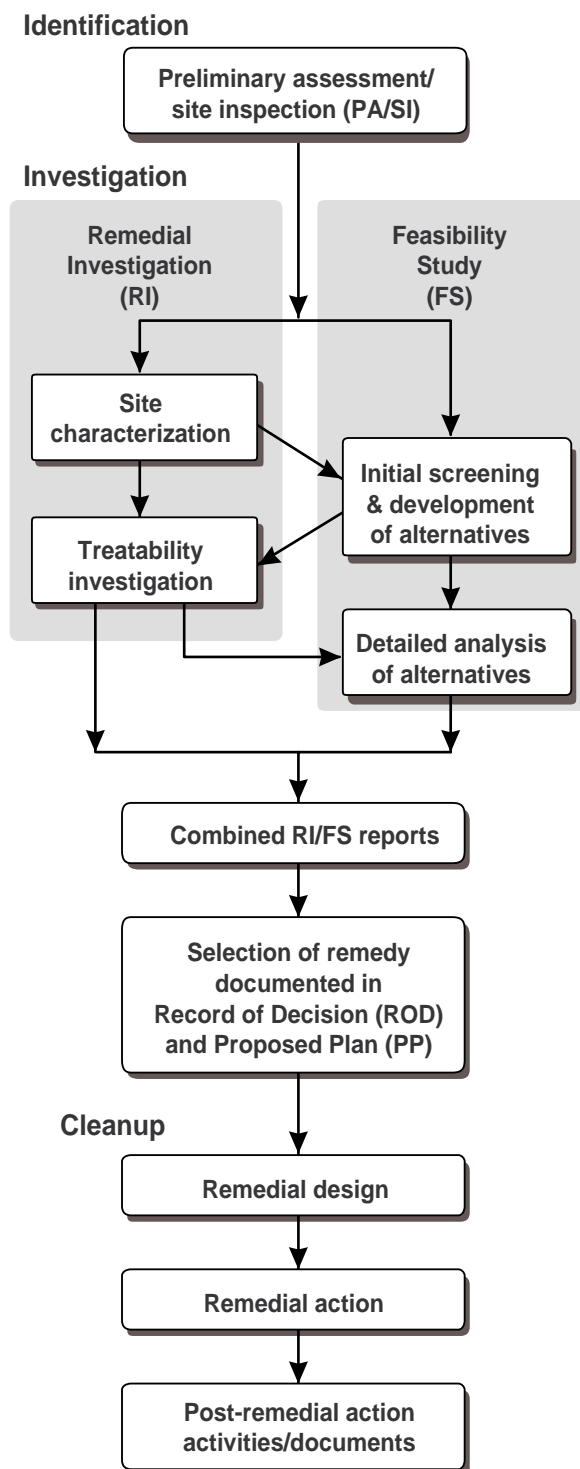
## **1.1 Regulatory Summary**

CERCLA requires specific steps to properly evaluate the size and extent of contamination, and its mobility and toxicity, and to implement cleanup solutions. After a contamination problem is identified, signatories to the FFA set the requirements for documentation, scheduling, and cleanup levels.

### **1.1.1 Remedial Response Process**

Figure 1 shows the process for identifying, investigating, and remediating a hazardous waste site. The preliminary assessment and site inspection (PA/SI) determine whether the site may be a candidate for expeditious cleanup or whether a more detailed and comprehensive assessment must occur. A remedial action begins with a two-phase remedial investigation/feasibility study (RI/FS).

The remedial investigation, which includes collecting and analyzing samples, characterizes the nature and extent of the contamination. A health risk assessment is included to evaluate the potential risks to public health and the environment from the contamination. The feasibility study then evaluates methods for remediating the problem. Both the remedial investigation and feasibility study must be thoroughly documented.



**Figure 1. Remedial response process.**

For larger efforts, the remedy is selected in the Proposed Plan (PP) and Record of Decision (ROD), which also provide the rationale for selection. Following a public comment period, an appropriate cleanup level and method of cleanup are selected and approved by EPA, RWQCB, and DTSC (as delineated in the FFA) for CERCLA sites. Design documents are then prepared, and the remedial action is implemented. Three other documents are also necessary post-ROD: the Compliance Monitoring Plan, the Contingency Plan, and the Construction Quality Assurance Plan.

### **1.1.2 Liability**

Ground water and soil contamination may result in economic losses, health impacts, and degradation of the environment. CERCLA imposes strict liability for parties deemed responsible for hazardous waste contamination. Thus, LLNL could be required to bear the entire cleanup costs for a contaminated site regardless of LLNL's contribution to the contamination, or to reimburse EPA for its costs of cleanup.

## **2.0 Applicability to LLNL Activities**

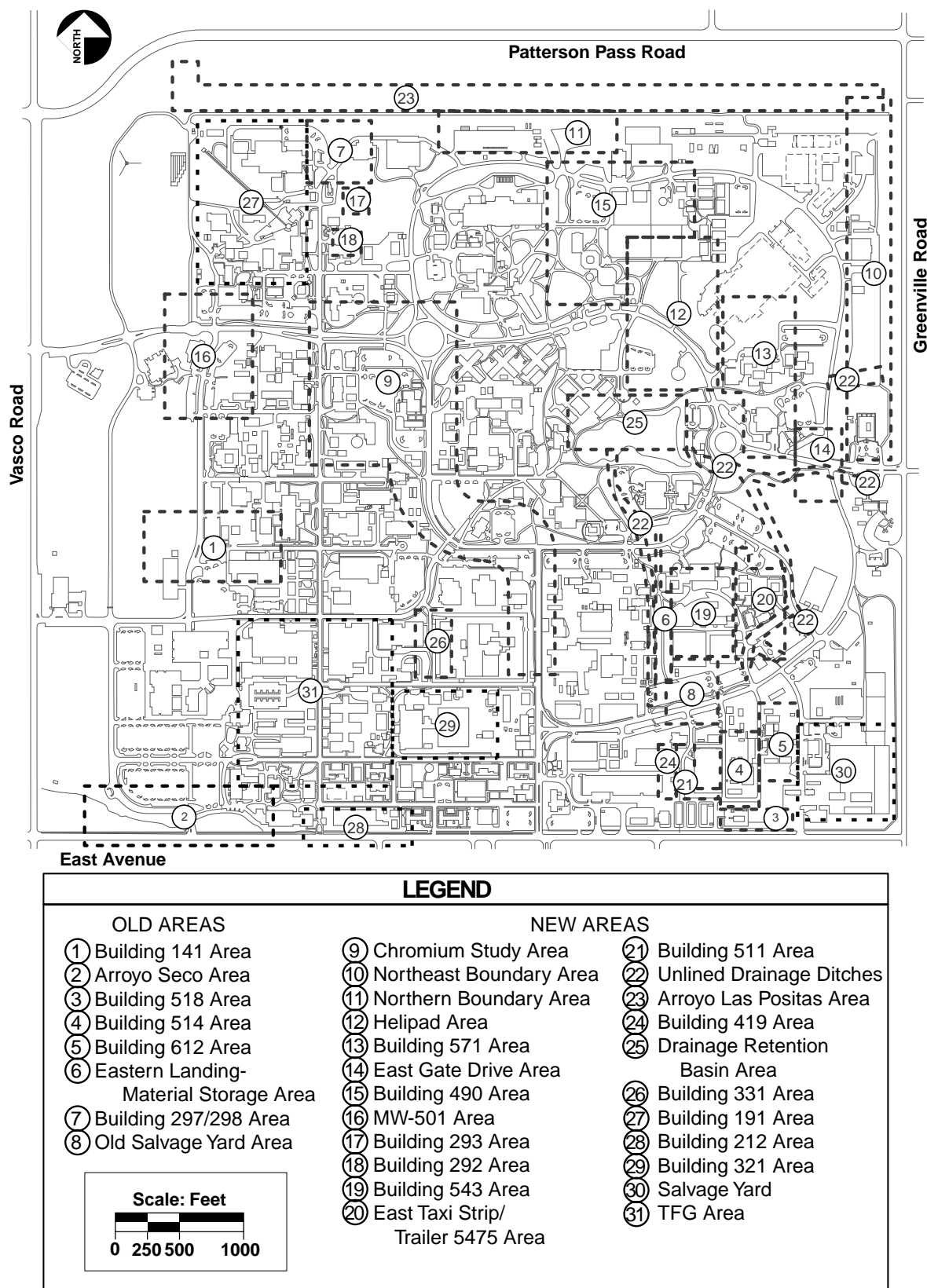
The LLNL Livermore site was placed on the NPL in 1987; Site 300 was placed on the NPL in 1990. A ROD was issued for the Livermore site in 1992. A separate cleanup program is underway at Site 300. You should be aware of the progress of these cleanup activities so your actions do not impede the cleanup program objectives.

### **2.1 LLNL Livermore Site Cleanup Activities**

Ground water and soils at LLNL were contaminated by use, storage, and disposal of hazardous materials, starting in 1942, when the U.S. Navy began operations at what is now the Livermore site. Key contaminants in both media include volatile organic compounds (VOCs), fuels, chromium, mercury, plutonium, and tritium. Figure 2 shows source investigation areas where these contaminants are located, based on historic data. Ground water contaminated at the LLNL site is currently about 2 miles from some of the city of Livermore's water supply wells.

EPA, DTSC, and RWQCB have been the key regulatory agencies overseeing the cleanup activities. An FFA, adopted in November 1988, specified the cleanup scope and schedule. In July 1992, a ROD was issued. It specified the following cleanup actions:

- Pumping water from 18 initial locations (well clusters) to contain and remediate the plumes of contaminants in the ground water.



**Figure 2. Source investigation areas – Livermore site.**



- Constructing eight onsite treatment facilities to treat the extracted ground water using different combinations of ultraviolet (UV)/oxidation, air stripping, ion exchange, and granular activated carbon, depending on the local mix of contaminants.
- Removing contaminant vapors in the soil by vacuum-induced venting and treatment by activated carbon.

An EPD document entitled *Remedial Action Implementation Plan*, dated January 6, 1993, provides more detail on the remediation program. EPD also issued six Remedial Design Reports for the various treatment units that incorporate Construction Quality Assurance Plans. Two other post-ROD documents have been issued: the Compliance Monitoring Plan and the Contingency Plan. Subsequent actual facility installations have been modified. In some cases, portable treatment units have been installed to replace planned final treatment facilities.

## 2.2 Site 300 Cleanup Activities

Past activities at Site 300, including the formulation, manufacturing, and testing of high explosives and the discharge of liquid waste materials to unlined evaporation ponds, have contaminated the soil and ground water. The principal soil contaminants include VOCs, fuels, metals, radionuclides, and high explosive compounds. The key ground water contaminants are chlorinated solvents and tritium.

An FFA for Site 300 was signed in June 1992. A site-wide Remedial Investigation Report, two feasibility studies, and a ROD for the General Services Area (GSA) Operable Unit (OU) have been completed. A removal action in the form of a pit cap has been completed at the Pit 6 area. An additional feasibility study for the entire site was completed in December 1999, and an interim ROD for the entire site was issued in 2001.

## 3.0 Responsibilities

Even though the CERCLA programs at the Livermore site and Site 300 are well underway, newly uncovered sites can still be included in the program. Therefore, it is essential that personnel at LLNL who are involved in projects that disturb soil, uncover debris, or employ large amounts of contaminated materials or wastes be aware of how to coordinate with the CERCLA program.

The Responsible Individual/project manager is required to notify the ES&H Team environmental analyst well before any construction project is underway or before soil and debris are to be disturbed at a project site. The reason is that potential contamination, which may be subject to the CERCLA program, could be discovered, and sufficient lead time must be provided for soil and debris management planning.

Delays in reuse or disposal can lead to double handling of soil and debris and to increased project costs.

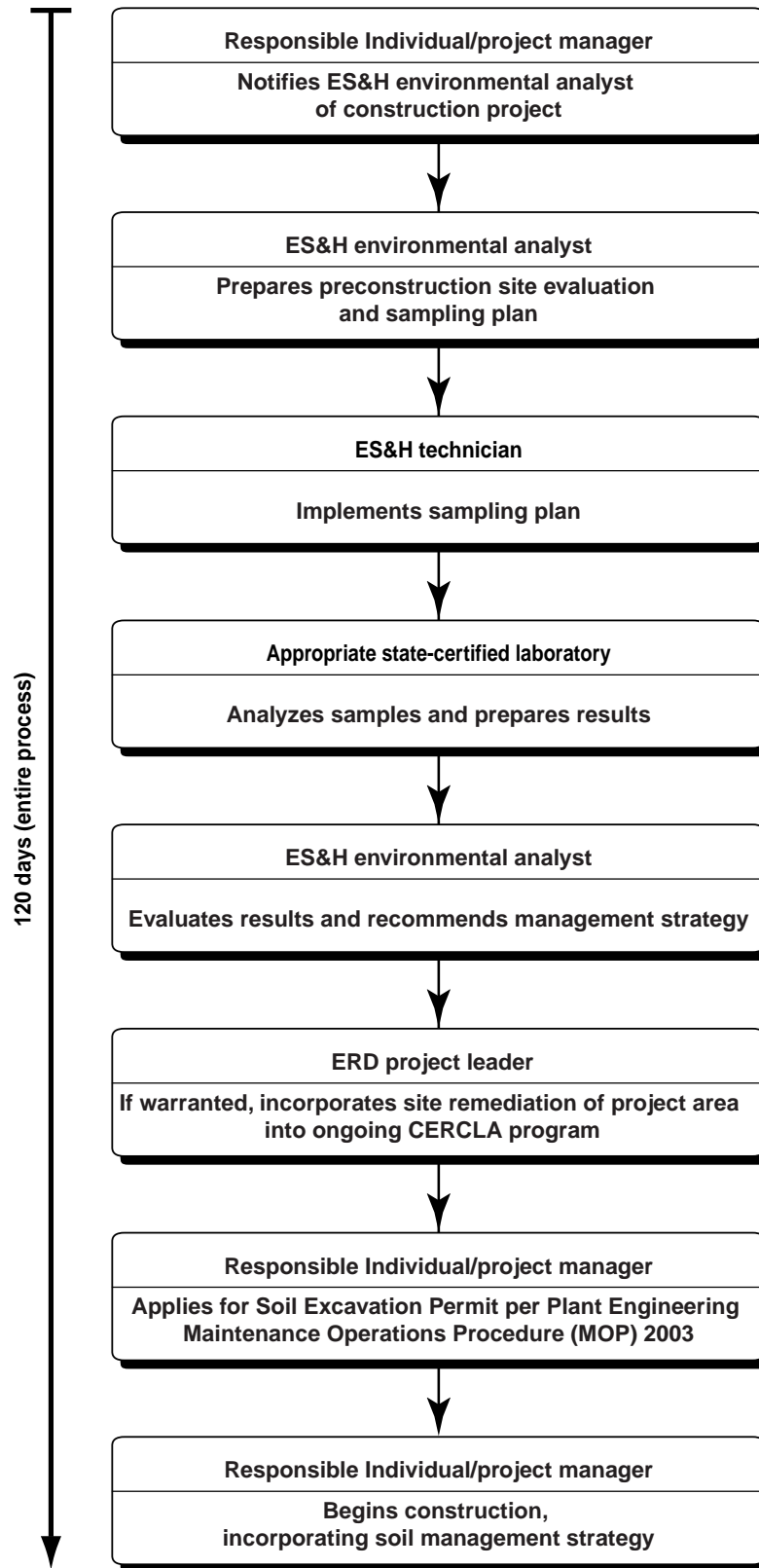
Figure 3 summarizes the responsibilities of the Responsible Individual/project manager, ES&H Team environmental analyst, and other key individuals. The Responsible Individual/project manager notifies the environmental analyst as soon as possible when a construction project is planned, but at least 120 days prior to construction. The Site Evaluation Request Form (see "Document 33.3, Appendix B) is filled out and given to the environmental analyst to document the request. You will need to provide enough information—project description, maps, and depths of excavation—for the ES&H Team environmental analyst to devise a sampling plan to uncover any possible contamination. The environmental analyst is also responsible for preparing a preconstruction site evaluation by comparing the project location with the Suspected Contaminated Areas map and related information. Equivalent maps are available for Site 300. The maps are updated by ERD personnel and indicate the current location of known contamination.

Once a project is properly referred to the ES&H Team environmental analyst, the analyst is responsible for coordinating with ERD to determine whether cleanup of the site, if it is contaminated, should be handled either inside or outside the CERCLA program and whether it is an expeditious or larger cleanup effort. Your initial and ongoing point of contact for these issues is always the ES&H Team environmental analyst.

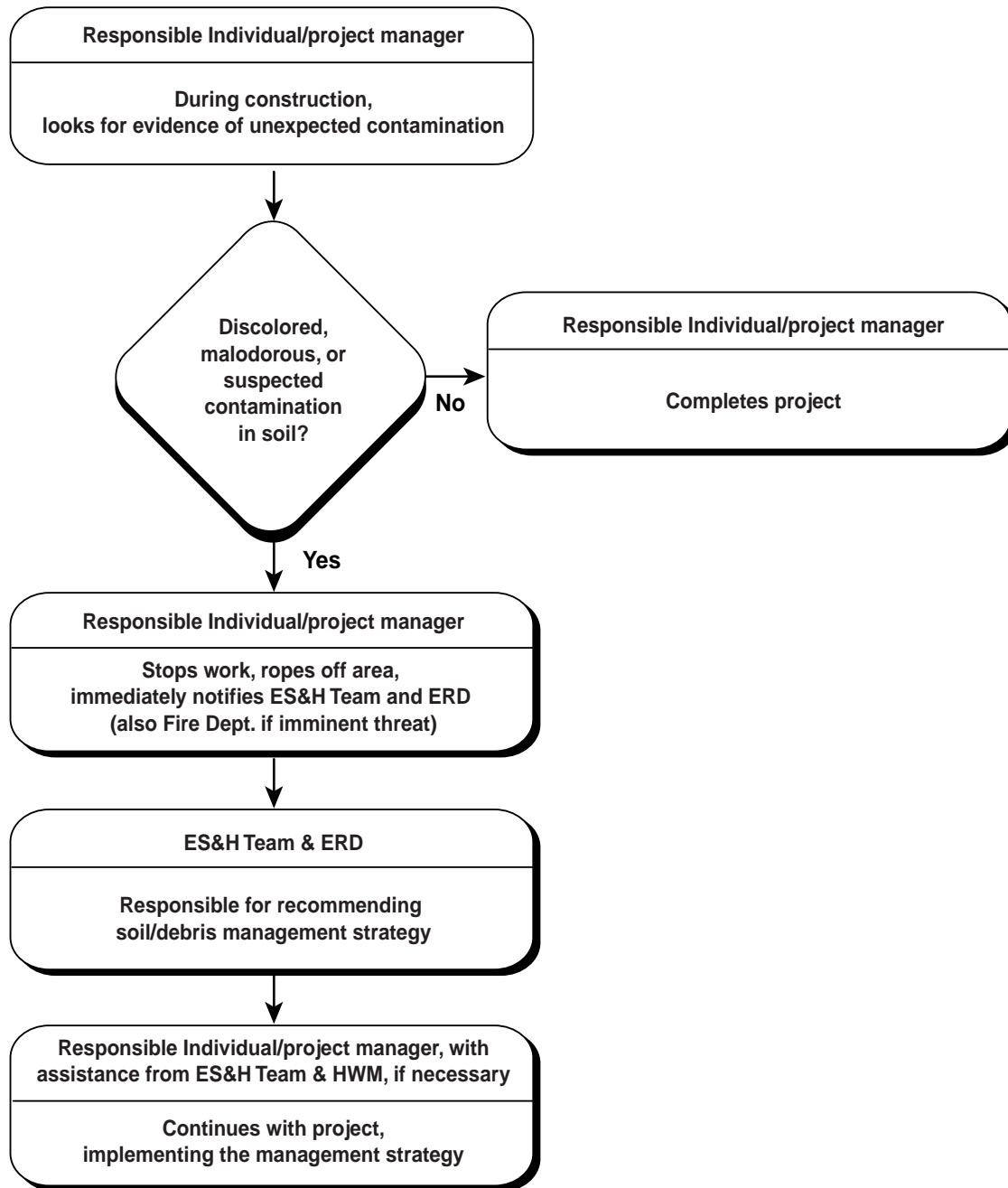
## **4.0 Process for Compliance During Construction—Soils and Debris Management**

Project sites should always be adequately characterized prior to construction. Nevertheless, it is possible that contaminated soil and debris may be encountered unexpectedly during excavation or related activities. Figure 4 summarizes the procedures that the Responsible Individual/project manager is required to follow during excavation, construction, or demolition to ensure that any contaminated soil or debris is properly managed. The process for compliance related to soil and debris management is discussed in more detail in Document 33.3.

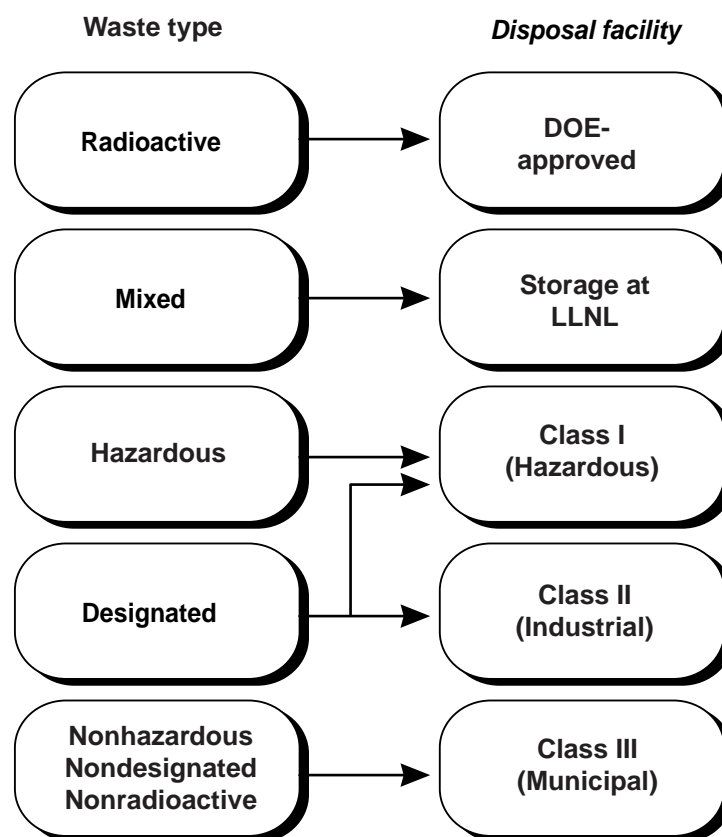
If potentially contaminated soil or debris are unexpectedly discovered, the Responsible Individual/project manager stops work and immediately notifies the ES&H Team environmental analyst so that the material can be evaluated. Samples are gathered to properly classify the soils and/or debris into one of five classes of waste types shown in Figure 5. Occasionally, further sampling is required. After evaluating the results, the ES&H Team environmental analyst recommends the proper method of handling any contaminated material. Most contaminated soil and debris uncovered during excavation can be managed outside the LLNL CERCLA program.



**Figure 3.** Responsibilities for soil and debris management planning prior to construction projects.



**Figure 4.** Procedures upon discovery of contaminated soil and debris during excavation, construction, or demolition projects.



**Figure 5. LLNL policy for disposition of soil and debris.**

The preferred method for handling uncontaminated soils is to use such material for landscaping or fill for other projects onsite. The ES&H Team and Plant Engineering's Space and Site Planning need to approve such disposition. The Site 300 Facility Manager has final approval of land use at Site 300. However, because of the LLNL endangered species program, when soils are to be spread in undisturbed areas of Site 300, approval authority to choose the appropriate site is extended to the ES&H Team environmental analyst by the Site 300 facility manager.

## 5.0 Work Standards

### 5.1 Work Smart Standards

40 CFR 300 et seq., National Oil and Hazardous Substances Pollution Contingency Plan

42 USC § 9601 et seq., Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)

Public Law 94-580, Resource Conservation and Recovery Act of 1976 (RCRA)

## 5.2 Other References

The Carpenter-Presley-Tanner Act (California Health and Safety Code Section 25300-25395)

The CERCLA Program, DOE 5480.14

DOE Order 232.1A, *Occurrence Reporting and Processing of Operations Information*, U.S. Department of Energy, Washington, DC (July 21, 1997)

Environmental Protection Department, Environmental Restoration Division, *Remedial Action Implementation Plan for the LLNL Livermore Site, Livermore, California*, Lawrence Livermore National Laboratory, Livermore, CA, UCRL-AR-110532 (1993)

Environmental Protection Department, Environmental Restoration Division, *Record of Decision for the Lawrence Livermore National Laboratory Livermore Site*, Lawrence Livermore National Laboratory, Livermore, CA, UCRL-AR-109105 (1992)

Environmental Protection Department and Plant Engineering, *Suspected Contaminated Areas Map*, Lawrence Livermore National Laboratory, Livermore, CA, PLC 85-099-153E (1986)

Executive Order 12316, Response to Environmental Damage

Executive Order 12580, Superfund Implementation

"Federal Facility Agreement Under CERCLA Section 120" between the United States Environmental Protection Agency, the United States Department of Energy, the California Department of Health Services, and the California Regional Water Quality Control Board (Nov. 1, 1988)

Plant Engineering, *Soil Excavation (Digging, Grading, Tunneling, Trenching, and/or Drilling) Permit Procedure*, Lawrence Livermore National Laboratory, Livermore, CA, MOP-02003 (February 2000)

U.S. Environmental Protection Agency, *CERCLA Compliance with Other Laws Manual* (1988)

Environmental Operations Group Standard Operating Procedure No.EO-04, "Preconstruction Site Evaluation."

## 6.0 Resources for More Information

### 6.1 LLNL Contacts

**Environmental Restoration Division (ERD) Staff**—The ERD investigates and remediates contamination at LLNL. It also maintains a database of all analytical results. It should be contacted for any questions on LLNL's CERCLA program.

**Environmental Operations Group** – Your supporting EOG analyst can provide the name and telephone number of an ERD contact for your questions.

**Environmental Safety and Health (ES&H) Teams** – These teams are composed of specialists from health, safety, and environmental disciplines for each programmatic area at LLNL. These teams provide support to all programs on ES&H issues. The team leader can identify the proper team member for assistance.

**Radioactive and Hazardous Waste Management (RHWM) Division** – Contact RHWM for assistance with handling LLNL-generated hazardous, designated, radioactive, or mixed waste. |

**Soil Management Committee** – This committee is composed of members of Plant Engineering and the Environmental Protection Department who ensure that the soil and debris management process works effectively and efficiently.